

REPLACED BY  
ART 24 AMBT

CLAIMS

1. A steel sheet for vitreous enameling excellent in workability, aging properties and enameling properties, said steel sheet containing, in mass,

5 C: 0.0050% or less,  
Si: 0.50% or less,  
Mn: 0.005 to 1.0%,  
P:  $10 \times (B-11/14 \times N)$  to 0.10%,  
S: 0.080% or less,  
10 Al: 0.050% or less,  
N: 0.0005 to 0.020%,  
B:  $0.60 \times N$  to 0.020%, and  
O: 0.002 to 0.0800%.

2. A steel sheet for vitreous enameling excellent in workability, aging properties and enameling properties, said steel sheet containing, in mass,

15 C: 0.0025% or less,  
Si: 0.050% or less,  
Mn: 0.10 to 0.50%,  
20 P:  $10 \times (B-11/14 \times N)$  to 0.030%,  
S: 0.030% or less,  
Al: 0.010% or less,  
N: 0.0035 to 0.0060%,  
B:  $0.60 \times N$  to 0.0060%, and  
25 O: 0.005 to 0.0450%.

3. A steel sheet for vitreous enameling excellent in workability, aging properties and enameling properties, said steel sheet containing, in mass,

30 C: 0.0025% or less,  
Si: 0.050% or less,  
Mn: 0.10 to 0.50%,  
P:  $10 \times (B-11/14 \times N)$  to 0.030%,  
S: 0.030% or less,  
Al: 0.010% or less,  
35 N: 0.0005 to 0.0033%,  
B:  $0.60 \times N$  to  $0.90 \times N\%$ , and  
O: 0.005 to 0.0450%.

REPLACED BY  
ART 34 AND 4

4. A steel sheet for vitreous enameling excellent in workability, aging properties and enameling properties according to any one of claims 1 to 3, said steel sheet  
5 further containing one or more of Nb, V, Ti, Ni, Cr, Se, As, Ta, W, Mo and Sn at 0.030 mass percent or less in total.

5. A steel sheet for vitreous enameling excellent in workability, aging properties and enameling properties  
10 according to any one of claims 1 to 4, said steel sheet satisfying the following expression:

(the amount of N existing as BN)/(the amount of N existing as AlN)  $\geq$  10.0.

6. A steel sheet for vitreous enameling excellent in workability, aging properties and enameling properties  
15 according to any one of claims 1 to 5, said steel sheet satisfying the following expression:

(the amount of N existing as BN)/(N content)  $\geq$  0.50.

20 7. A steel sheet for vitreous enameling excellent in workability, aging properties and enameling properties according to any one of claims 1 to 6, characterized by:  
the steel sheet containing simple or compound nitrides, that contain B or Al, 0.02 to 0.50  $\mu\text{m}$   
25 in diameter;

the average diameter of said nitrides being 0.080  $\mu\text{m}$  or larger; and

the proportion of the number of the nitrides 0.050  $\mu\text{m}$  or smaller in diameter to the total  
30 number of said nitrides being 10% or less.

8. A method for producing a steel sheet for vitreous enameling excellent in workability, aging properties and enameling properties, characterized by:

retaining a slab containing the components  
35 according to any one of claims 1 to 4 in the temperature range from 900 to 1,100°C (Retained Temperature Range 1)

for 300 min. or longer before commencing hot rolling;  
thereafter retaining it in a temperature  
range not less than 50°C higher than said retained  
temperature (Retained Temperature Range 2) for 10 to 30  
5 min.;

then cooling it to a temperature range not  
less than 50°C lower than said retained temperature  
(Retained Temperature Range 3) at a cooling rate of  
2°C/sec. or less;  
10 retaining it in said Retained Temperature  
Range 3 for 10 min. or longer; and  
thereafter commencing hot rolling.

9. A method for producing a steel sheet for  
vitreous enameling excellent in workability, aging  
15 properties and enameling properties according to claim 8,  
characterized by further controlling the time period from  
the time when the coiling of a hot-rolled steel sheet  
terminates at a temperature of 700 to 750°C in a hot-  
rolling process to the time when the temperature of said  
20 steel sheet reaches 550°C or lower to 20 min. or longer.

10. A method for producing a steel sheet for  
vitreous enameling excellent in workability, aging  
properties and enameling properties according to claim 8  
or 9, characterized by:

25 commencing hot rolling;  
after the reduction ratio reaches 50% or  
more, retaining the hot-rolled material in the  
temperature range from 900 to 1,200°C for 2 min. or  
longer with the temperature of said material not lowered  
30 to 900°C or lower; and

thereafter commencing the hot rolling  
again.